

Radionuclide Imaging of Acute Myocardial Infarction with Tc-99m (Sn)-Diphosphonate (EHDP)

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Tc-99m EHDP was utilized for myocardial imaging in 8 patients with chest pains. All 7 patients with clinical, electrocardiographic and enzymatic evidences of acute myocardial infarction had positive myocardial scintigrams. But one of the patients who had repeated scintigrams on the 30th post-infarction day had negative scintigrams.

If the scintigrams are obtained during the 4th to 6th days of post-infarction, the size of positive image is related to the degree of infarction size with occasional reduced activity in the central area. This "doughnut" appearance of Tc-99m EHDP was well visualized in one of our patients who suffered from extensive, acute myocardial infarction, and was also seen by our study on animal

models. Tl-201 was not incorporated into ischemic or infarcted areas, and this radionuclide only visualized non-ischemic areas. In contrast, Tc-99m EHDP was taken up into the ischemic and infarcted areas, predominantly into the peri-infarction zone with resultant imaging of "doughnut" appearance.

In patients with significant ischemia but without infarction failed to show positive scintigrams and was helpful to rule out infarction in one of our patients.

Myocardial imaging with Tc-99m EHDP is simple, safe and reliable method to detect and to localize acute myocardial infarction if performed within 1 week after infarction, and is helpful to estimate the infarction size.

Myocardial Perfusion Scanning by Using Rb-81 and/or Tl-201

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For the detection of regional myocardial perfusion abnormality noninvasively, myocardial scintiscannings were performed at rest and exercise, by using Rb-81 or Tl-201.

Myocardial imaging by Rb-81 was performed using a scintillation camera (Pho/Gamma-HP) equipped with a pinhole collimator and specially constructed lead shield, which was required because of high energy gamma emission from the Rb-81. Without lead shield, image resolution was inadequate, whereas with the shield (especially 5 cm thick) images of diagnostic quality were obtained.

Images taken with 511 KeV photon peak and with 190 KeV photon peak were compared, and the former showed better image resolution.

Myocardial imaging by Tl-201 was performed by Pho/Gamma-HP scintillation camera equipped

with 15000 parallel hole high resolution collimator.

Scintigrams were obtained in anterior, LAO and left lateral position at sitting in Rb-81 and at supine in Tl-201.

For exercise studies, patients underwent a graded ergometer exercise stress test under continuous ECG monitoring. Patients exercised to the point of positive ST-change or 85% of predicted maximal heart rate, at which time tracer was administered intravenously. Exercise was continued additional one minute.

In normals, myocardial images showed horseshoe or 0-shaped appearance and concentration of tracer was relatively uniform throughout myocardium.

In all transmural myocardial infarctions (14 patients), regional perfusion defects (cold spot) were detected, and their locations correlated well